

# WatchTime

THE WORLD OF FINE WATCHES

# E-SPECIAL

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## PILOTS' WATCHES

### A PILOT TESTS

- BREITLING
  - BELL & ROSS
  - ZENITH
  - TUTIMA
- AND 5 MORE



## 9 REVIEWS FROM THE PAGES OF WATCHTIME

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“Pilots’ Watches” Special Tablet Reprint, June 2013



This special tablet issue contains a review of nine pilots’ watches. It was published in WatchTime magazine in April 2012 and is reproduced here as it originally appeared. We sent the watches – seven chronographs and two three-handed watches – up with a trio of aerobatic pilots to see how they would stand up to a series of stomach-wrenching midair maneuvers. Afterward, we interviewed the pilots about the watches’ suitability for life in a cockpit. We timed the watches before and after their flights to find out whether, or how much, their rates had been affected. For each watch, we list salient assets and drawbacks, according to our own assessments and those of the pilots.

## 4 READY FOR TAKEOFF BY GWENDOLYN BENDA AND MARTINA RICHTER PHOTOS BY ZUCKERFABRIK FOTODESIGN

We sent nine pilots’ watches – from Oris, Sinn, Bell & Ross, Breitling, Damasko, Hanhart, Mühle, Tutima and Zenith – into the skies to see how they’d fare during a program of 14 aerobatic stunts, specially designed for our test. Including takeoff and landing, the watches were subjected to stress for about 20 minutes, and encountered G-forces ranging from +7 to -4.

ON THE COVER: Clockwise from top left, the Breitling Chronomat GMT, the Bell & Ross BR 03-94 Chronograph Steel, the Zenith Captain Pilot Chronograph, and the Tutima Grand Classic Chronograph UTC. Photos by Zuckerfabrik Fotodesign



# WatchTime

THE MAGAZINE OF FINE WATCHES

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*We sent nine pilots' watches into  
the skies to see how they'd fare  
during a stomach-wrenching series  
of aerobatic stunts.*



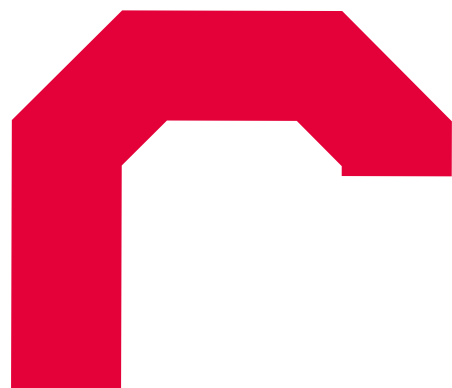


# READY FOR TAKEOFF

BY GWENDOLYN BENDA AND MARTINA RICHTER  
PHOTOS BY ZUCKERFABRIK FOTODESIGN







Can your watch handle a humpty bump? A humpty bump is an aerobatic maneuver in which the plane flies upward vertically, perpendicular to the ground and, after spinning around once, does a back flip and descends in a coma-inducing loop. We thought that this stunt, along with a series of other equally hairy aerial tricks, would be a good way to test a pilots' watch's mettle.

We selected two three-hand pilots' watches and seven pilots' chronographs to accompany a trio of pilots — aerobatics champion Klaus Lenhart and his protégés Axel Schütte and Andreas Langer — while they performed an aerobatic program, specially designed for our test, in the skies above the Swabian Mountains in southern Germany. Lenhart, who is the owner and CEO of Germany's Leki sporting goods company, flew a sporty, single-seat Leki Extra 330 SC; Schütte, an Extra 300 L; and Langer, a Giles 202.

The program consisted of 14 aerobatic figures, lasting a total of about 5 minutes. Including takeoff and landing, the watches were subjected to stress for about 20 minutes. They encountered G-forces ranging from +7 to -4. By comparison, a passenger aircraft banking for a turn exerts about 2 Gs; a rollercoaster ride 4 to 6 Gs.

We measured each watch's rate behavior on a timing machine before and after the aerobatic flight. The pilot's appraisal of each timepiece was also included in the overall verdict. In particular, the pilot judged each watch's legibility under various lighting conditions during the flight, as well as rendering judgment on its wearing comfort, user friendliness and timekeeping reliability.





## ORIS Swiss Hunter Team PS

The Swiss Hunter Team PS Edition pays homage to the historical aircraft of the Patrouille Suisse. The watch has a giant, 8.5-mm-wide crown. With its wide, deep grooves, the crown is very easy to use and, despite what you might guess, does not press uncomfortably into the back of the wearer's wrist. The watch itself, with a nearly 44-mm diameter, approaches gargantuan status and is as large as any watch should be, Lenhart said. He was a bit disappointed to discover that the fluted bezel cannot be rotated.

The Oris's dial boasts outstanding legibility. All of the hands are exactly the right length and are well proportioned, and their Super-LumiNova BG W9 coating glows in the dark with a handsome turquoise gleam. The luminous Swiss cross on the short end of the seconds hand is a real eye-catcher: it's the "trademark" of this special edition and in daylight it shows the classic white-on-red color scheme. Contrary to our expectations, the slim white end of this hand doesn't glow in the dark. Its outermost tip ex-

tends all the way to the ring on the dial's edge, where the strokes for seconds (or minutes) are located, and the inner end of the white portion is tangent to a wreath of numerals for indicating the hours from noon to midnight in 24-hour style, i.e., from 13 to 24.

Lenhart liked the attractive styling, which is emphasized by a curved sapphire crystal that's nonreflective on the inside. The multi-part case is sealed by a fully threaded back, which contains a transparent pane of mineral crystal bearing an image of the Swiss Hunter teams. This logo, together with the winding rotor, conceals the unembellished Oris Caliber 733. Based on a Sellita Caliber SW 200-1, this movement is identical in its structure to the ETA 2824-2. It ran quite well, gaining 4.8 seconds per day when fully wound. This gain remained unchanged after the test flight. The movement accelerated somewhat after it ran for 24 hours, gaining 7.8 seconds.

The Big Crown Swiss Hunter Team PS has a slightly domed leather strap with a pronged buckle. A red sling secures the band's second loop. The watch is packaged in a special case along with a certificate and a silk scarf.

*The watch's crown is 8.5 mm wide, making it easy to grasp and turn.*

### SPECS

#### ORIS SWISS HUNTER TEAM PS

**Manufacturer:** Oris SA

**Functions:** Hours, minutes, central seconds, date

**Movement:** SW 200-1, automatic; diameter = 25.6 mm; height = 4.6 mm; 26 jewels; 28,800 vph; 38-hour power reserve; nickel balance; Nivarox hair-spring; Incabloc shock absorber; Etachron fine regulation; satin-finishing

**Case:** Stainless steel with sapphire crystal and mineral crystal caseback window; water resistant to 100 meters

**Strap and clasp:** Leather strap with stainless-steel pronged buckle

**Dimensions:** Diameter = 43.89 mm, height = 11.82 mm, weight = 96 grams

**Price:** \$1,750



*The emblem of the Swiss Hunter Team adorns the glass caseback.*

#### PROS:

- + Rate results/running performance
- + Craftsmanship
- + Easy-to-use large crown
- + Day/night legibility
- + Wearing comfort

#### CONS:

- No rotating bezel
- Unadorned movement



*The Super-LumiNova coating on the numerals, indices and hands is clearly visible in the dark. The seconds hand bears a Swiss cross on its shorter end.*



**PROS:**

- + Day/night legibility
- + Craftsmanship
- + Wearing comfort
- + Running performance when fully wound

**CONS:**

- Crown moves stiffly when setting second time zone
- Buckle prong is too slender



The hands and markers glow brightly, but there are no single-minute indices.

## SINN 857 S UTC

The Sinn 857 S UTC, with its imposing stainless-steel case with black PVD coating, makes a solid first impression, as does its cowhide strap, although the prong on the buckle seems a bit delicate. Examining the case and strap under a watchmakers' loupe reveals clean craftsmanship, and the strap feels pleasantly supple.

Lenhart strapped the watch on and confirmed its wearing comfort: "The case feels nice and light, and the strap fits comfortably," he said. After the aerobatic flight, he was still impressed by the comfortable fit of the 857 S UTC, and he reported that its operating elements performed well, too. The bidirectionally rotating bezel clicks authoritatively into place and the crown, despite its bold profile, fits well between the fingers. Only when setting the second time zone do you



The dial has large, clear calibrations that are easy to read in daylight.

With a date display and a second time zone, this watch offers functions not typically found in a pilots' watch.

feel an obvious resistance, which can probably be traced to the movement.

The dial scores points with large, cleanly printed calibrations and sharply pointed hands that are long enough to be read easily. Lenhart said the dial is easy to read when there's sufficient light. However, when lighting is poor, you can only make out the time to the nearest five-minute interval, which is inadequate for an aviator.

The watch contains the ETA Caliber 2893-2, which performed with admirable precision both on the ground and in the air. With a fully wound mainspring, it gained about 2.5 seconds: it ran 2.9 seconds fast before the flight, 2.2 seconds fast immediately afterwards, and 2.6 seconds fast 3 days later.

To sum up: the Sinn 857 S UTC offers high legibility, excellent craftsmanship, wearing comfort and ease of operation, as well as a famous-name movement that delivers acceptable rate performance. This watch, with its sporty-chic styling, will probably persuade the wearer to overlook the imprecision of 5-minute calibration at night, the resistance in the crown and the slender prong on the steel buckle. The watch's outstanding daytime legibility and a rotating bezel were features that Lenhart especially liked.



**SPECS**

SINN 857 S UTC

**Manufacturer:** Sinn Spezialuhren GmbH

**Functions:** Hours, minutes, central seconds, date, second time zone

**Movement:** ETA 2892, automatic; diameter = 25.6 mm; height = 4.1 mm; 21 jewels; 28,800 vph; 42-hour power reserve; Glucydur balance; Nivarox hair-spring; Incabloc shock absorber; Etachron fine regulation; decorated with Geneva waves, circular graining and spiral patterns; polished, blued screws

**Case:** Stainless steel with hardened coating; sapphire crystal; water resistant to 200 meters

**Strap and clasp:** Cowhide strap with stainless-steel pronged buckle

**Dimensions:** Diameter = 42.97 mm, height = 11.94 mm, weight = 102 grams

**Price:** \$2,170



## BELL & ROSS BR 03-94 Chronograph Steel

The Bell & Ross BR 03-94 Chronograph Steel reminded Axel Schütte of a cockpit instrument. With its large hour and minutes hands, this chronograph looks like the coarse/fine altimeter in his plane, Schütte said. This resemblance is enhanced by the 42-mm-square stainless-steel case with four screws at the corners to keep it securely closed.

This watch looks quite handsome on the wrist. Schütte was particularly impressed by its legibility. Large white hands contrast very well with the matte black dial. Good legibility is made even better by the large numerals 12 and 6, which work well with 60 white minutes indices. The case's matte finish also enhances the legibility: only the edges of the case are polished, thus reducing the likelihood of annoying glare or reflections. The date is placed between 4 and 5 o'clock, where it doesn't eclipse any of the minutes indices. However, the date display is somewhat small, so more than a fleeting glance may be needed to read it.

*The finely matte-finished case prevents glare and reflections. As is appropriate for a pilot's watch, additional information about the model and its components is shown on the caseback.*



Of course, a pilot doesn't check the date very often. He's far more interested in knowing the exact time, and that's one area in which Bell & Ross excels. In our test, the fully wound watch gained 3.3 seconds and we measured its balance's amplitude at 294 degrees. The rate was even better when the chronograph was switched on: the daily gain decreased to just 2.4 seconds, although the amplitude declined somewhat, to 286 degrees. The Bell & Ross was relatively unaffected by wild loops and other aerobatics. After the maneuvers, our timing machine measured a gain of 0.7 seconds and the balance's amplitude was 274 degrees. These overall satisfying results were confirmed by a measurement we made 3 days after the flight, when this flight-friendly chronograph gained 2.6 seconds and its balance oscillated with an amplitude of 294 degrees.

"The Bell & Ross is essentially comfortable to wear," Schütte said. The rubber strap holds the watch firmly on the wrist and prevents it from slipping or sliding, although Schütte said the rubber made his wrist perspire during the flight. The smoothly running crown contributes to the user-friendliness of the BR 03-94. To-the-second setting is easy thanks to a stop-seconds function, which instantly stops the small seconds hand when the crown is pulled outward. Operating the chronograph mechanism is a bit more difficult: Schütte reported that the push-pieces were a bit clumsy to handle and somewhat hard to operate. If you happen to press the wrong button by mistake, your measurement is not lost because the zero-return function is blocked.



*Numerals, hands and indices all glow in the dark with a bright blue hue. The indicators' large dimensions make it very easy to read the time.*

### PROS:

- + Easily recognizable
- + Good rate results
- + Design
- + Legibility

### CONS:

- Pushers are difficult to operate
- Strap uncomfortable in heat
- Date display is too small

### SPECS

**BELL & ROSS BR 03-94  
CHRONOGRAPH STEEL**

**Manufacturer:** Bell & Ross

**Functions:** Hours, minutes, small seconds, chronograph, date

**Movement:** ETA 2894-2, automatic; diameter = 28 mm; height = 6.1 mm; 37 jewels; 28,800 vph; 47-hour power reserve; gold-plated nickel balance; Nivarox hairspring; Incabloc shock absorber; bipartite index fine regulation; decorated with Geneva waves and circular graining; blued screws

**Case:** Stainless steel with nonreflective sapphire crystal; water resistant to 100 meters

**Strap and clasp:** Rubber strap with stainless-steel pronged buckle

**Dimensions:** Diameter = 42 mm, height = 12.1 mm, weight = 149 grams

**Price:** \$5,300

*Instead of screws in the back, four screws in the front keep the monocoque case of the Bell & Ross securely closed.*





## SPECS

### BREITLING CHRONOMAT GMT

**Manufacturer:** Breitling SA

**Functions:** Hours, minutes, small seconds, chronograph, date, GMT, tachymeter, rotating bezel

**Movement:** Breitling 04, automatic; diameter = 30 mm; height = 7.2 mm; 47 jewels; 28,800 vph; 70-plus-hour power reserve; Glucydur balance; Nivarox hair-spring; Kif shock absorber; index fine regulation; decorated with Geneva waves and satin finishing; polished screws, COSC-certified

**Case:** Stainless steel with nonreflective sapphire crystal; water resistant to 500 meters

**Bracelet and clasp:** Stainless steel with folding clasp

**Dimensions:** Diameter = 47.8 mm, height = 18.4 mm, weight = 263 grams

**Price:** \$9,820

*This boldly styled watch boasts a 24-hour display, a rotating bezel, a tachymeter scale and water resistance to 500 meters.*



## BREITLING Chronomat GMT

For many watch lovers, a Breitling is the epitome of a pilots' watch. The Chronomat GMT, which we chose for our test, has a chronograph with tachymeter scale, a date display, and — always a useful function for pilots — a second time zone with 24-hour display. The last indicator, which relies on an additional central hour hand, is a feature of the new Breitling Caliber 04, based on Caliber 01, which was developed in-house. The newer caliber boasts exactly the same traits as its predecessor: a column-wheel chronograph with vertical coupling, a 70-hour power reserve, and a COSC chronometer certificate. The Chronomat GMT performed impeccably: after it had been fully wound, it ran with an average daily gain of just 1.1 seconds, and it maintained this excellent precision when we tested it right after landing and again 24 hours later. The watch ran slightly faster when the chronograph was switched on. This is as good as it gets.

When Langer strapped the Breitling watch to his wrist, he found the bracelet to be much too long, although it could be fairly easily shortened via the screwed lugs. The size and weight didn't bother our pilot at first, but afterwards he remarked that this big timepiece tended to get snagged.

Langer shared Lenhart's opinion about the rotating bezel: both pilots agreed that this is a useful accessory. Langer demonstrated its usefulness by turning it into position for a specific interval, although he found the tachymeter scale on the edge of the dial

*The time-display components are clearly distinguished from each other. The red arrowhead on the 24-hour hand is more prominent than the elapsed-seconds hand.*

### PROS:

- + In-house caliber
- + Multiple functions
- + Precise rate
- + Good nighttime legibility
- + Good craftsmanship and design
- + Well-known brand

### CONS:

- Reflections on the dial during the day
- Case tends to get snagged
- High price



*The large luminous dot on the rotating bezel can be seen easily, even in a dark cockpit.*

too small for his taste. Furthermore, he said, "there's always something sparkling, glittering or glaring in the sunlight," making it more difficult to read the time. Nonetheless, the time display is more prominent than the chronograph function and is always the first thing you see, especially when the dial is viewed in the dark. A dot on the bezel glows quite clearly and helps you see at a glance where 12 o'clock is. You have to unscrew the buttons before starting the chronograph. The large, easy-to-grip crown is also screwed down. When it is unscrewed and pulled out to its middle position, it can be used to adjust the hour hand either forward or backward; it also re-adjusts the date display accordingly. This is very useful when traveling through different time zones. The 24-hour hand makes it easy to keep track of the hour in your home time zone.







*The dial of the Damasko DC67 Si is easy to read. The day and date are just below the dial's midline. "Si" stands for silicon, from which the hairspring is made.*

## SPECS

### DAMASKO DC67 SI

**Manufacturer:** Damasko Uhrenmanufaktur

**Functions:** Hours, minutes, small seconds, day/date, chronograph, rotating bezel

**Movement:** ETA 7750, automatic; diameter = 30 mm; height = 7.9 mm; 25 jewels; 28,800 vph; 50-hour power reserve; screw balance; Nivarox hairspring; Incabloc shock absorber; bipartite index fine regulation; decorated with Geneva waves, circular graining and satin finishing; blued screws

**Case:** Stainless steel with ice-hardened PVD coating; nonreflective sapphire crystal; water resistant to 100 meters

**Strap and clasp:** Shrunken leather and rubber strap with pronged buckle

**Dimensions:** Diameter = 43.2 mm, height = 13.6 mm, weight = 117 grams

**Price:** \$3,850



*The entire dial of the Damasko DC67 Si glows in the dark thanks to a coating of Super-LumiNova C1.*

## PROS:

- + Modified movement
- + Good rate results
- + Good case construction
- + Multiple functions
- + Good day/night legibility
- + Reliable operation
- + Comfortable to wear

## CONS:

- High amplitude after test flight
- Strap rubs against lugs

## DAMASKO DC67 Si

This watch is packed with high-tech features. Its manufacturer, Damasko, headquartered near Regensburg, Germany, is an expert in case construction. The case of the DC67 Si is milled from a solid block of steel and has a specially hardened PVD coating. It withstands pressure to 100 meters, is secured against low pressure, and is protected against magnetic fields up to 80,000 A/m. This watch also boasts a patented system for its crown and push-pieces. Viton insulators for these buttons are equipped with a long-lasting lubricant and have extremely high chemical stability. The same traits distinguish the O-ring

*The bezel on the Damasko can be operated easily. The same is true for the chronograph buttons and the threaded crown.*



in the fully threaded, screw-in caseback. The bezel rotates in both directions and, thanks to a patented mechanism, it clicks accurately into place, a detail that its tester, Langer, particularly liked. The easy-to-grip ring runs smoothly on ceramic elements and leaves no uncertainty about precisely where it's positioned — exactly what a pilot demands.

A pane of sapphire, with nonreflective treatment on both sides, offers a clear view of the dial, whose black-on-white color scheme is somewhat unconventional for a pilots' watch. (A white-on-black version is also available.) Langer praised its distinct numerals and the prominence of its time display. This watch is very easy to read, including in the dark, because the entire background of the dial is luminous. The chronograph functions perform well. The buttons demand a bit of extra pressure, but work reliably. Before the crown can be used, it must first be unscrewed, but this is no problem thanks to the narrow grooves in the crown's sides. The crown can be grasped easily and pulled into its individual positions.

Damasko also made technical changes in the movement, the ETA 7750, equipping it with a reinforced barrel and

a rotor that runs on ceramic bearings. Damasko manufactures the rotor. The brand also switched the positions of the day and date displays. The letters "Si" in the model's name stand for "silicon": a deep-etching process is used in the manufacture of this watch's silicon hairspring, which "breathes" beneath a balance with weight screws along its rim. The special escapement system helps the DC67 Si achieve very good rate values: an average gain of 3.8 seconds when fully wound and +1.9 seconds immediately after the test flight. Those values meet the manufacturer's objective: to build a watch that keeps time as accurately as a certified chronometer. We did notice, however, that the amplitudes were very high immediately after the flight, but when we repeated the measurements later, everything had returned to normal, with the watch deviating from perfect timekeeping by 5.3 seconds per day.

When Langer took off this watch, he noticed that part of the strap rubs against the tapered lugs, a detail that could be improved. As for the strap's wearing comfort, Langer had no criticisms: with leather on top and rubber inside, he said it felt pleasant against his skin.





*Stylish red accents give the watch pizzazz.*

## HANHART Pioneer Twin Dicator

The Pioneer Twin Dicator was still just a prototype when we tested it as part of our pilots' watch review. Although it debuted as a new model just last year, it seems familiar because it echoes the styling of historic Hanhart chronographs. The story began in 1938 with the monopusher chronograph Caliber 40: the lone button was marked in red and positioned above the crown, close to the lug. The button was repositioned downward one year later. This red button is a distinctive feature on watches from this German-Swiss company.

Needless to say, Lenhart was pleased to see the rotating bezel. This one turns a bit too easily, but we expect that this will be corrected in the serially manufactured model. Some colored markings and the engraving on the back aren't exactly right, either. The elapsed-time hands, for example, should end in red tips, and a reversed color scheme should be used on the combined subdial for the elapsed hours and the running seconds at 9 o'clock, where the chronograph function should be red and the small seconds hand should be white.

The historical bicompass arrangement, with a subdial for the seconds on one side and another subdial for the elapsed minutes on the other, has been preserved, although the Twin Dicator also tallies elapsed hours. Hanhart created this additional function through a complex, modular reworking of the ETA 7750 caliber. Now these displays have been moved toward the edge of the dial.

As far as the legibility of the time is concerned, our test pilot had absolutely no complaints. The white Arabic numerals contrast clearly with the black background, and the somewhat old-fashioned-looking "skeleton" hands are easily distinguished from each other. The difference

*In the dark, the hands contrast especially well with the Arabic numerals.*

### PROS:

- + Modified movement
- + Well-balanced rate behavior
- + Historical design
- + Good day/night legibility
- + Reliable operation
- + Comfortable to wear

### CONS:

- Chronograph counters are small
- Strap is too short



*As on many Hanhart watches, the top chrono pusher is closer to the lug than the bottom one.*

between the hands is even more obvious in the dark because they glow more brightly than the 10 Arabic numerals.

The Twin Dicator's movement runs quite uniformly: it gained 4.3 seconds when fully wound and 4.2 seconds immediately after the test flight, thus proving that this watch is a genuine flying ace. The riveted strap matches the pilots'-watch styling perfectly. "It's comfortable to wear, but a bit too short for me," Lenhart said.

### SPECS

#### HANHART PIONEER TWIN DICATOR

**Manufacturer:** Hanhart AG

**Functions:** Hours, minutes, small seconds, chronograph, rotating bezel

**Movement:** ETA 7750, automatic; diameter = 30 mm; height = 7.9 mm; 35 jewels; 28,800 vph; 42-hour power reserve; Glucydur balance; Nivarox hair-spring; Incabloc shock absorber; bipartite index fine regulation; decorated with satin finishing; skeletonized rotor

**Case:** Stainless steel with sapphire crystal; water resistant to 100 meters

**Strap and clasp:** Calfskin strap with rivets; pronged buckle

**Dimensions:** Diameter = 45.2 mm, height = 15.58 mm, weight = 137 grams

**Price:** \$5,850



*Only at second glance can the orientation triangle at 12 o'clock be distinguished from the tip of the hour hand.*

## MÜHLE S.A.R. Flieger-Chronograph

The exterior of the S.A.R. Flieger-Chronograph is impeccably crafted, except for the folding clasp, which has sharp edges. Lenhart appreciated the matte finish on the stainless steel case because it doesn't cause glare in the cockpit, but he wasn't very impressed by the rubber strap. "It's not very good when one perspires, but it's still better than a heavy, stainless steel bracelet," he said.

Lenhart liked the legibility of the dial. He didn't mind that the hour and minutes hands sometimes slide behind the seconds subdial and that the edges of all hands are rather rough, but he warned that the hour hand's triangle could easily be mistaken for the triangle marking 12 o'clock. This danger also lurks at night, when the absence of minute strokes further detracts from the legibility.

Our test pilot was impressed by the Mühle's user-friendliness: the rotating bezel clicks firmly into place, and the crown and push-pieces are on the left side of the dial, where a pilot can easily reach them while flying.

The crown performs well: there's no unwanted play in the hands when the wearer sets the time. Clean craftsmanship, with the sole exception of a scratch on the rotor, distinguished automatic Caliber MU 9408, which is based on an ETA 7750. Among other changes, Mühle equips the base caliber with a three-quarters plate and a woodpecker's-neck fine adjustment mechanism. Unfortunately, the finishing seems somewhat pedestrian.

The MU 9408 gained a little more than 3 seconds before the flight, both when fully wound and after having been allowed to run for 24 hours. As the mainspring gradually slackened, the amplitude declined from 284 to 260 degrees. The rate behavior remained similar when the chronograph was switched on, although the amplitude decreased to 246 degrees under the stress of being left running for 24 hours with the chronograph switched on the entire time.

The test flight confused the movement, but only temporarily. It was running slow by 2 seconds immediately upon landing, but ran 3.2 seconds fast three days later. The amplitude increased to 295 degrees directly after the flight, but returned to normal three days later.

With acceptable legibility and a high degree of wearing comfort, the S.A.R. Flieger-Chronograph is a welcome companion on an aviator's wrist. The absence of a leather strap detracts from the wearing comfort, but this minor issue is quickly forgotten when one admires the craftsmanship and the reliability of the movement, which coped quite well with the aerobatic flight.

### SPECS

#### MÜHLE S.A.R. FLIEGER-CHRONOGRAPH

**Manufacturer:** Mühle Glashütte GmbH

**Functions:** Hours, minutes, small seconds, chronograph, rotating bezel

**Movement:** MU 9408, based on ETA 7750, automatic; diameter = 30 mm; height = 7.9 mm; 25 jewels; 28,800 vph; 48-hour power reserve; gold-plated nickel balance; Nivarox hairspring; Incabloc shock absorber; woodpecker's-neck fine regulation; decorated with sunburst patterns, circular graining and satin finishing; blued, polished screws

**Case:** Stainless steel with sapphire crystal front and back; water resistant to 100 meters

**Strap and clasp:** Rubber with folding clasp

**Dimensions:** Diameter = 45 mm; height = 16.65 mm; weight = 169 grams

**Price:** \$3,999



#### PROS:

- + Good craftsmanship
- + User friendly
- + Reliable movement
- + The brand's own modifications

#### CONS:

- Less-than-ideal wearing comfort of strap and clasp

*The pushers are on the left side of the case, making them easy to reach.*



*The case has a matte finish, which prevents glare in the cockpit.*

**PROS:**

- + Daytime legibility
- + Craftsmanship
- + Wearing comfort
- + User friendliness
- + Rate behavior

**CONS:**

- Poor nighttime legibility
- Rotating bezel is hard to turn



*The minutes can't be read in the dark.*



*The second time zone is shown by a skeletonized, center-mounted hand.*

## TUTIMA Grand Classic Chronograph UTC

Tutima specializes in pilots' watches. Collectors appreciate this brand's historic models, and NATO pilots wear Tutima's Chronograph 798 as part of their official equipment. Langer gave good grades to the Grand Classic's case and strap. "The case is pleasantly lightweight and shaped for comfort," he said. He was also pleased to discover that the case, thanks to its fluted bezel, didn't cause unwanted glare. The supple strap fit well and the clasp stayed closed without pressing uncomfortably against the inside of his wrist. The buckle's prong is both massive and flexible.

The calibrated scales are neatly printed on the dial, but irregularities are noticeable in the luminous material on the hands. This watch was easy to read in the cockpit, Langer reported. He didn't mind the absence of indices on the seconds subdial, but noted that the minutes indices were invisible in the dark.

The Grand Classic is user-friendly with one exception: the rotating bezel is so firmly mounted that Langer couldn't turn it with just one hand. The pushers, too, required quite a bit of force, but when they trigger their functions, they emit a clicking sound that's audible above the noise in the cockpit. The crown turns smoothly between your fingers.

The watch contains the automatic ETA 7754, which is well crafted and handsomely decorated. It ran with a constant gain of nearly 4 seconds, both when fully wound and after being allowed to run for 24 hours. The rate remained unchanged, regardless of whether the chronograph was switched on or off.

The aerobatic flight slowed the movement somewhat. The caliber gained 2.9 seconds immediately after returning to earth, and the gain increased to 3.4 seconds 3 days later. The amplitude was unaffected by the aerobatic maneuvers: it was not quite 310 degrees when the watch was fully wound, and it decreased to 290 degrees after the timepiece was left running for 24 hours or when the

chronograph was on. The amplitude dipped to 265 degrees when both occurred simultaneously, i.e., the watch had been running 24 hours and the chronograph was switched on.

The Grand Classic Chronograph UTC proved its suitability for airborne duty. The daytime legibility is good, the craftsmanship is neat, and the degree of wearing comfort is high. All functions except the rotating bezel were easy to use, and the movement ran even more accurately after the flight than before.

*The bezel on the Tutima is so firmly mounted that it won't always turn with just one hand.*



**SPECS**

**TUTIMA GRAND CLASSIC  
CHRONOGRAPH UTC**

**Manufacturer:** Tutima Uhrenfabrik GmbH

**Functions:** Hours, minutes, small seconds, second time zone, date, chronograph, rotating bezel

**Movement:** ETA 7754, automatic; diameter = 30 mm; height = 7.9 mm; 25 jewels; 28,800 vph; 46-hour power reserve; gold-plated Glucydur balance; Anachron hairspring; Incabloc shock absorber; bipartite index fine regulation; decorated with Geneva waves, circular graining and satin finishing; blued, polished screws

**Case:** Stainless steel with sapphire crystal front and back; water resistant to 100 meters

**Strap and clasp:** Leather strap with pronged buckle

**Dimensions:** Diameter = 43.08 mm, height = 16.4 mm, weight = 112 grams

**Price:** \$4,000





*The time display dominates the dial, but the stopwatch function is also easy to read.*

#### PROS:

- + In-house caliber
- + Good rate results
- + Day/night legibility
- + Wearing comfort

#### CONS:

- No stop-seconds function
- Rate slightly in the "minus" column
- Start/stop button operates stiffly



*At night the chronograph seconds hand can only be seen as a dark vertical line that halves the index at 12 o'clock. The small-seconds subdial is also invisible at night.*

## ZENITH Captain Pilot Chronograph

This chronograph from the relatively new Captain line is currently Zenith's only pilots' watch. Delving into Zenith's history, we discovered the story of its pilots' watches. In response to a special request from the Italian air force, Zenith built the Cairelli chronograph in the 1960s. Although the modern Captain Pilot Chronograph is intended to hark back to this watch, its exterior has little in common with it, except for one important detail: the bicompass arrangement of a classic pilots' watch. The elapsed minutes are shown at 3 o'clock and the running seconds appear on a subdial at 9 o'clock.

The Captain Chronograph, 42 mm in diameter, has a highly legible dial, earning praise from Lenhart, who also liked the watch's wearing comfort. The simple but well-shaped stainless steel case fits well around the wrist, and the comfort is further enhanced by the high quality of the rubber-lined alligator strap.

Long, white wedges mark the hours. These team up with elegantly tapering white hands that contrast clearly with the black dial and the chronograph functions. The chronograph indicators are easy to read, as is the small-seconds subdial and the date at 6 o'clock. Lenhart said that the chronograph pusher at 2 o'clock was too stiff, but he liked the smoothly operating crown. This watch contains the well-known, in-house El Primero caliber, which doesn't provide a stop-seconds function. This 5-hertz caliber runs in all situations with little deviation of rate, but with a slight loss of 0.2 second per day when fully wound and a loss of 1.1 seconds immediately after the test flight. Zenith's chronograph and its quickly oscillating balance can measure intervals to 1/10-second, so the dial is correspondingly calibrated around its edge. Zenith's watch is also the only one in this review with a telemeter scale, which calculates distances by using the speed of sound. With it, we determined, luckily at the end of our testing session, that there was an electrical storm 7 kilometers away: the chronograph measured 21 seconds between a lightning bolt and a thunderclap. ○

#### SPECS

##### ZENITH CAPTAIN PILOT CHRONOGRAPH

**Manufacturer:** Zenith SA

**Functions:** Hours, minutes, small seconds, date, chronograph, telemeter

**Movement:** Zenith El Primero 4002, automatic; diameter = 30 mm; height = 6.6 mm; 31 jewels; 36,000 vph; 50-plus-hour power reserve; gold-plated nickel balance; Nivarox hairspring; Kif shock absorber; bipartite index fine regulation; decorated with Geneva waves, circular graining and satin finishing; skeletonized rotor; blued, polished screws

**Case:** Stainless steel with sapphire crystal front and back; water resistant to 50 meters

**Strap and clasp:** Alligator and rubber strap with pronged buckle

**Dimensions:** Diameter = 41.86 mm, height = 12.26 mm, weight = 83.5 grams

**Price:** \$6,400

*The 36,000-vph El Primero is very precise but lacks a stop-seconds function.*





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